mentioned that most investigators have used BAV-RL to designate valves with fusion of the right and left coronary cusps. Although it is correct that classifications based on the specific cusps that are fused may be more commonly used, we believe that the BAV phenotype can also be classified by mentioning the spatial orientation after fusion. Sometimes, it may in fact be impossible to determine the individual cusps involved. Furthermore, phenotype classification using spatial orientation (BAV-RL versus BAV-AP) may better represent the functional significance. Such classification has been used before, for example, in embryological (2) and imaging research (3,4). To avoid confusion, we made sure to explain the terms used in our paper (BAV-RL and BAV-AP) in the table and figure legends.

The potential association between the flow helix in the aorta and aortopathy type in patients with BAV is another very important topic (5). The predominant pattern of the flow helix may well be dependent on BAV phenotype. Dr. Barker and colleagues showed that the orientation of the flow helix is predominantly right-handed, but they predominantly analyzed patients with 1 specific pattern (fusion of the right and left coronary cusps, 12 of 15 patients). Previous observations have shown that right-handed helical flow is predominant in BAV patients with fusion of the right and left cusps, as opposed to left-handed helical flow in BAV patients with fusion of the right and noncoronary cusps. Thus, we believe that our statement regarding a potential association between BAV phenotype and helical flow orientation has valid support from scientific observations by other investigators.

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MDCT in TAVR for Better Implant Angle and Outcomes

We read with interest the paper by Samim et al. (1) on the use of automated 3-dimensional analysis of pre-procedural multidetector computed tomography (MDCT) to predict an optimal C-arm angle for transcatheter aortic valve replacement (TAVR) and the potential improvement in outcomes.

Previous research (2) had shown that pre-procedural MDCT can provide accurate operator-defined optimized implant angles (OIAs) and that implant angle prediction is related to MDCT image quality. Rotational angiography intraprocedurally predicts the OIA even more accurately than does MDCT (3,4), and an OIA appears to be associated with less paravalvular regurgitation (PVR) (4).

We have several comments on the study design. The authors ingeniously attempted to mitigate the confounding impact of operator experience by randomly assigning patients from December 2009 to June 2011 into angiography (Cohort B) and MDCT (Cohort A) cohorts in a 1:4 fashion, respectively. In chronologically spaced research in which operator experience likely matters, it is almost impossible to completely mitigate bias. Cohort B patients had numerically lower implantation time and contrast and radiation exposure—were the 11 and 24 patients in Cohorts B and A, respectively, sufficient to definitively exclude this potential bias? Operator experience had previously been linked with procedural outcomes. Further analysis in a larger cohort from this randomized cohort (MDCT vs. B) may be worthwhile.

Second, the study mandated that an aortogram not be performed up front in the MDCT group, and this at least partially accounted for the procedural parameter difference. Nonetheless, remarkably, no MDCT cohort patient needed more than one aortogram, whilst 89% of angiography-cohort patients needed more than one aortogram.

Last, issues on benefit on clinical outcome. We are unclear regarding the reduced need for balloon post-dilation in the MDCT cohort—as this is not related to valve malpositioning per se, which would potentially be a consequence of a poor implant fluoroscopic angle. The study unfortunately did not correct for potential confounders such as valve undersizing and valve calcification, particularly with regard to outcomes such as PVR.

MDCT improves TAVR sizing and most data suggest a reduction in PVR. The idea of "better angle, better outcomes" seems intuitive but more data is needed. Further data to confirm the overall clinical outcome improvement from MDCT is eagerly awaited.

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